

Acoustic Pingers for Submarines & AUVs



U-Boat Worx personal submarine; Inset - Sub on back of megayacht

The economy must be in recovery because sales of personal submarines and autonomous underwater vehicles (AUV) are on the rise. Not long ago personal submarines were high tech toys available only to the super wealthy and AUVs were expensive pieces of equipment used primarily by the military and oil industry. Thanks to advances in technology that reduced their cost, both are now in widespread use by individuals, businesses, and universities.

One company specializing in private submersibles is U-Boat Worx in the Netherlands. Their subs are renowned for their agility, reliability, compact size, and competitive price. These underwater vehicles are popular with tourist destinations, scientific missions, and a wide range of boating enthusiasts. Several different models are available that can carry from 2 to 5 persons and have depth ratings from 100 to 1,000 meters. One feature found on many subs is an acoustic pinger. This underwater signaling device transmits a sound wave that

can travel 5 to 10 kilometers and be detected by a pinger receiver. Having a pinger attached to the personal submarine allows its movement to be tracked from the surface. This capability is particularly helpful when testing new models and designs. When it came to choosing an acoustic device that would be best for their operations, U-Boat Worx picked JW Fishers MFP-1 multifrequency pinger because, like the sub maker, Fishers has an established reputation for providing rugged reliable underwater equipment at a reasonable price.

The autonomous or “unmanned” underwater vehicle has become commonplace in the oceanographic industry and scientific community. The number of AUVs has grown dramatically because of its ability to stay submerged for extended periods and its capacity to carry cameras, sonar, and a variety of sensors that gather data on the subsea environment. (continued on pg 3)

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Universities use underwater metal detectors for research

University of California at Santa Barbara is one of many universities using u/w metal detectors in their research programs. Hunter Lennihan, professor of applied marine ecology at UCSB, is cultivating disease resistant abalone in an effort to increase their numbers. To gather the needed data, researchers must examine the health of many individuals over an extended period of time. To aid in locating and tracking the shellfish, researchers affix a small metal tag to each abalone and use Fishers Pulse 8X detector to relocate them.

Read about more universities using Fishers equipment on page 3.



Researcher working for Prof. Hunter Lennihan (inset) uses Pulse 8X to relocate abalone

Marine Service Companies Track Pipes and Cables

Utility companies having been laying pipes and cables across the ocean floor for more than a century. Prior to the introduction of GPS, marking their position was a difficult and tedious task, fraught with error. It is extremely important to know the exact location of existing lines before undertaking dredging operations or before new lines are laid down. The amount of overburden typically makes it impossible to locate these lines with conventional metal detectors as the burial depth is beyond the detector's range. Two pieces of equipment that have proved most effective are the pinpointing magnetometer and the cable tracker.

One company using both of these devices is Gray Diving Services in Australia, one of the largest onshore civil diving contractors in the country. They have the expertise and resources needed to design, construct and manage almost any subsea engineering job. To aid in their pipeline and cable installation and repair work Gray acquired JW Fishers PT-1 pinpointing magnetometer and CT-1 cable tracking system. Project manager Adam Gunn reports the PT-1's ability to pinpoint targets, even in areas surrounded by steel structures, is extremely helpful as many pipes and cables are located near bridges, seawalls, or other structures made of steel or steel reinforced concrete.



Diver searches with PT-1 magnetometer

Another company in the Asia Pacific Region doing submarine fiber optic and power cable installation and maintenance is NAVA 19 Engineering. To locate and track these cables NAVA 19 is using Fishers CT-1. Owner Varapoj Tangpojthavipol reports, "We are presently involved in a cable laying project to Samui." Ko Samui is Thailand's second largest island after Phuket. "First we had to locate the existing power and communication cables so as not to disturb them when we laid down the new 115KV power cable. Our divers had excellent results with the CT-1 and found it precise and easy to operate. Once the old cables had been located, we put the power cable down into a 1.5m deep trench in the seabed. (see pg 4)

International News

.....National Marine Services in the Sultanate of Oman is using a SeaOtter-2 ROV in their underwater inspection and survey operations.

.....Hydro-Martech in the Falklands Islands is using the Pulse 8X metal detector to locate unexploded ordnance (UXO) and other debris in an area where a coring rig will be placed.

.....Hydroremont Ltd, a commercial diving and marine services company in Bulgaria, is using Fishers Proton 4 boat-towed magnetometer in the survey operations.

.....ECA Robotics, a French manufacturer of work-class ROVs, has purchased their third Fishers RMD-1 remote metal detector. The RMD-1 is specially designed to be unaffected by the electrical noise generated by most ROVs.



ECA Robotics ROV with Fishers RMD-1 remote metal detector mounted on front

.....International Marine Works, a diving and marine contractor in Egypt, has a SeaLion-2 ROV to assist in their projects.

.....Worley Parsons, an international conglomerate that supplies customers with professional services in the energy, resource, and complex process industries is using Fishers Pulse 12 boat-towed metal detector in its Australia West operations says marine scientist Paul Nichols.

.....Japan's NTT-WE Marine Corp, a company specializing in laying subsea power and communications cables is using Fishers CT-1 cable tracking system.

.....Algoasibi Diving and Marine Services in Saudi Arabia is using Fishers Diver Mag 1 hand-held magnetometer and the PT-1 pinpointing magnetometer.

.....National University of Singapore's Acoustic Research Lab has purchased Fishers SFP-1 acoustic pinger.

.....Ocean Science Services at the Marine Institute in Galway, Ireland is using Fishers DHI-1 acoustic interrogator and MFT-1 acoustic transponder to mark the location of oceanographic instruments. **JWF**

Magnetometers Help Diving Companies & Explorers



Photo by: Steve Barsky

Diver scans area with Fishers Diver Mag

Commercial diving companies and explorers are among the wide range of groups acquiring magnetometers to help in their underwater search operations. Magnetometers are super sensitive instruments that detect iron and steel at hundreds of feet away. These devices assist in array of tasks which include; hunting for shipwrecks and artifacts, locating and tracking pipelines, looking for lost tools and equipment, tracking down weapons and explosives, pinpointing the position of anchors and moorings, and finding sunken vessels and submerged vehicles.

One organization employing this technology is Great Lakes Exploration Group. The group's president, Steven Libert, has spent the last 28 years researching the history surrounding Le Griffon, the first European ship to have sailed the upper Great Lakes. Le Griffon was built by the legendary French explorer Rene-Robert Cavalier, and was a vital link in LaSalle's supply route between Niagara and Illinois. It was also one of the 8,000 ships lost in the lakes. In 1679 Le Griffon went missing while transporting men and supplies needed to support LaSalle's effort to expand exploration of the Mississippi River.

During a routine dive in 2001, Libert came upon what he believes are the remains of this historic vessel. With much of the ship entombed in the lake bottom, some high tech equipment was needed to verify his find. Libert contacted JW Fishers, a specialist in underwater search systems, for some advice and equipment. It was decided the PT-1 pinpointing magnetometer would be the best choice as it could easily locate individual ferrous artifacts even on a wreck site littered with many iron objects. Using the PT-1, Libert has located (continued on pg 4)

Government Agencies, Universities, & Military Perform U/W Searches

.....The Jackson School of Geosciences at the University of Texas Austin has purchased several of Fishers SFP-1 acoustic pingers and the PR-1 pinger receiver.

.....University of West Florida's Archaeology Institute has acquired a Pulse 8X metal detector. "We have been using the Fisher Diver Mag magnetometer for the last year and getting good results with it", reports Prof. Greg Cook. "So when we needed an underwater metal detector, I went right to JW Fishers."

.....New York's Department of Environmental Protection, the agency responsible for maintaining infrastructure that supplies the city with drinking water, has purchased Fishers SeaLion-2 ROV. The agency has used one of Fishers original SeaLions since the early 90s. When it was time to replace, Fishers was the logical choice said the agency's Mike Allen.

.....Port of Hueneme/Oxnard Harbor District in California is using Fishers SeaOtter-2 ROV. The compact remote controlled underwater video system performs inspections of piers, seawalls and other underwater structures as well as inspection of ship hulls for smuggled contraband or drugs.

.....SHOM, France's Hydrographic Service which also supports the country's defense agencies has purchased a large quantity of Fishers SFP-1 acoustic pingers.

.....The Dept. of Archaeology at Flinders University in South Australia is using a Pulse 8X detector reports Marine Archaeology Officer John Naumann.

.....Peruvian Navy's Dept. of Oceanography, Hydrography, and Navigation is using several of Fishers Proton magnetometers. This department is responsible for providing the navy with the most current information on the environment they operate in; including hazards to navigation created by sunken vessels or other debris in waterways. **JWF**



Peruvian Navy deploys Proton 4 mag

Contd from page 1 - Pingers for Subs &...



NC State Univ. U/W Robotics Team with their AUV and JWF acoustic pinger

An essential piece of equipment on the AUV is the acoustic pinger which allows the vehicle to be recovered should it fail to return to the surface. One group making an AUV and using the pinger for a completely different application is the North Carolina State University Underwater Robotics Team. NCSU's Robotics club is a student run organization that designs and builds autonomous submersible robots. Each year the team enters its vehicle into the Robosub Competition sponsored by the AUVSI Foundation and U.S. Office of Naval Research. Students from more than two dozen high schools, colleges, and universities from around the world compete in this annual event. The robots must accomplish a variety of tasks including maneuvering through an obstacle course, retrieving and dropping payloads, and navigating to locations marked by an acoustic pinger. NCSU students are busy constructing a vehicle capable of performing the many complex operations required. To test their vehicle's ability to accomplish the task of navigating to an acoustic beacon, the team needed a pinger for trials. They choose JW Fishers SFP-1 single frequency pinger for it's low cost and because its specifications met the Robosub requirements. Club president Matt Wiggins says his team is focused on winning and confident they'll bring home a prize from this year's competition.

Other groups using Fishers pingers and receivers are: US National Marine Fisheries Service, Korea's Hydrographic and Oceanographic Admin., Univ of South Florida, FUNDESPA at the Univ of Sao Paulo in Brazil, Univ of Delaware's College of Marine, Ocean & Environment, and India's Underwater Robotics Society. **JWF**

Commercial News

.....After Hurricane Sandy hammered the New Jersey coast, marine contractor WJ Castle and Associates was called in to perform numerous underwater inspection and repair operations. One was a survey of the support pilings of the Mantoloking Bridge in Ocean County. Castle's survey team used their Fisher SSS-100K/600K side scan sonar to do the job.

.....Unitek Environmental Guam, a full service HAZMAT company with specialty support in hazardous materials remediation is using the Pulse 8X u/w metal detector.

.....Global Infrastructure, a provider of offshore and inland subsurface services for the energy industry has acquired a JW Fishers PT-1 pipe tracking magnetometer.

.....Phoenix Marine, a NY construction firm with extensive experience in above and below water rehabilitations, is expanding and taking on projects as far away as Alaska. To assist in these operations the company has added Fishers Proton 4 magnetometer, a super sensitive detector of iron and steel targets.



Chris Juredin in Tortola, BVI with his Fisher Proton 4 magnetometer

.....Chris Juredin, owner of Commercial Dive Services in the British Virgin Islands uses his Proton 4 magnetometer to locate lost anchors, moorings, sunken vessels, pipelines, and a variety of other targets. When he's not using the mag for work, he's out searching local waters to find some of the hundreds of wrecks in the area. Already Chris has located several interesting sites strewn with cannons.

.....L-3 MariPro's diving operations manager Mark Wardman reports, "We've located a lot of pipes and cables with our Fisher Pulse 8X metal detector." **JWF**

Tracking pipes & cables (contd from page 2)

After the cable was buried the divers used the CT-1 cable tracker to verify its position and burial depth.

The CT-1 is being used on another island half way around the world from Thailand, on Prince Edward Island in Canada. Maritime Electric owns and operates a fully integrated power system that includes generation transmission and distribution of electricity to customers throughout PEI. Most of the electricity is purchased from off island sources and is supplied through two submarine power cables under the Northumberland Strait. Periodically these cables require maintenance and repair and Maritime Electric employs Fishers cable tracking system for the job. The CT-1 not only locates and tracks the cables, but can locate faults and breaks in the lines.



Maritime Electric Divers with CT-1 probe

In Africa, Subsea 7, a global leader in seabed to surface engineering and construction, is working on the Escravos Gas Project. Chevron Nigeria in partnership with the Nigerian National Petroleum Company are creating what is being called the world's second largest national gas project. The partners are constructing the Escravos Gas-to-Liquids (EGTL) plant which is expected to expand to 120,000 bpd within 10 years. To allow the movement of cargo to and from the construction site, the Nigerian Ports Authority mounted a major effort to expand the port and its entry channels. More than 53.6 million cubic meters of material has been dredged from the area to accommodate ships drafting up to 12.5 meters. In addition, a number of light houses were renovated and 69 channel marker buoys installed. Subsea 7 has been a major provider of equipment and services for this huge project. To assist in the location of pipes and cables, the company acquired a quantity of Fishers PT-1 pinpointing magnetometers.

Other companies using the PT-1 and CT-1 are France Telecom Marine, Algaosabi Diving in Saudi Arabia, Alpha Logistic in Tanzania, and Hong Kong Contractors. *JWF*

..... From the TREASURE CHEST.....



Nichols with Pulse 8X and recovered ring

.....Bill Nichols, owner of Timber Bay Scuba in Wisconsin reports, "I was called to search for a man's gold wedding ring in North Two Lakes near Lake Tomahawk. The man lost it while swimming with his dog. I found the ring, it was buried in silt in about 10 feet of water. It took only about 20 minutes to find, but that ring would still be lost if I didn't have the Pulse 8X."

.....Jim Marquard reports, "Over the Christmas holidays my son and I took the new Pulse 8X detector down the Wisconsin River near the dam. We scanned the bottom of the swift moving, ice cold water and found a number of interesting items including an old 22 caliber pistol. The detector is great, easy to use, and the aluminum land handle is perfectly balanced. The audio alarm is a big plus so I can watch were I'm walking and not trip over things."

Magnetometers Help Divers (contd from page 2)

what he believes is one of the ship's iron rail guns and marked its position for future excavation and recovery. To protect the scientific and historic value of this incredible find, a partnership has been established with the state of Michigan and the Republic of France. Officials are eager to visit the site as weather permits.

Another explorer utilizing the magnetometer is professor and maritime archaeologist Greg Cook at the University of West Florida in Pensacola. "The thrill of discovery is what I love about archaeology" says Cook. "When you pick up an artifact that is more than a century old, it's like travelling through time". The professor works with the university's Archaeology Institute, which is both an educational and research facility. Part of their mission is the examination of historic and prehistoric sites, both on land and underwater. In addition to a professional staff of nine archaeologists, the institute has artifact

.....Canadian Craig Quinn took his Pulse 8X detector to the country's Magdalen Islands, which belonged to famous Boston explorer and British officer Richard Gridley in the 1700s. The islands were home to an extensive seal population that were harvested for their pelts and meat. Quinn located more than 500 musket balls and a number of 1720s coins.

.....Dave Sullivan of Antigua loves his Pulse 8X. Recent recoveries include a pewter bowl and spoon, and bronze rudder control found "somewhere in the Caribbean". Dave also has Fishers Proton 4 magnetometer he uses to locate the main wreck sites.



Sullivan with his Pulse 8X and "treasures"

conservation labs, exhibit space, and lots of special equipment including remote sensors for the marine environment. One of these devices is Fishers Diver Mag 1 hand-held magnetometer which can locate a large wreck a quarter mile away.

Archaeologists and explorers are not the only ones working with magnetometers. Commercial diving and marine service companies have also discovered the advantages of using these powerful detectors. When San Diego Gas and Electric needed to track some gas lines running under San Diego Bay, the operations supervisor Dan Carr turned to Fishers for guidance. Because the pipe was buried 12 to 15 feet under the ocean floor, the Diver Mag was recommended as the best option for this operation. With assistance from the commercial dive team at CW Divers, Carr and his crew were able to follow the gas line's route across the bay. He reported, "The mag worked good. It's so powerful, when we got close to shore, it even detected a nearby steel pier". *JWF*

Fishers Detectors Locate Weapons and Evidence

Police departments and sheriff's offices around the country are adding underwater metal detectors (UMD) to ensure their dive teams have the right equipment to effectively do their job. An essential tool for locating evidence disposed of in a waterway, metal detectors routinely assist in finding weapons, shell casings, stolen objects, and explosive devices.

One group having great success with the UMD is Houston County Rescue in Webb, Alabama. Team members are highly trained public safety divers that provide assistance to law enforcement, emergency management, fire, and medical agencies upon request. Working in a joint operation with the Coffee County and Dale County Sheriffs Departments, HCR member Jeff May used his JW Fishers Pulse 8X detector to locate several rifles and shotguns thrown into the Choctawhatchee River that runs between the counties. The weapons had been stolen in a burglary and their recovery was essential to prosecute the perpetrators.

In nearby Daphne County the local search and rescue team also used a detector to locate items taken in a robbery. Lt. Josh Gibbs reports several large industrial drill bits were stolen from a construction business and the criminals dumped them in a pond assuming they would be lost forever. Using his Pulse 8X Lt. Gibbs recovered more than a dozen pieces of missing property which helped bring the suspects to trial.

Underwater metal detectors are so effective, and their use has become so widespread, that agencies training public safety divers are developing courses on how to best utilize these devices. Two of these organizations are Dive Rescue International in Ft. Collins, CO and the Underwater Crime Scene Investigation Team at Florida State University. **JWF**



Houston County Rescue's Jeff May with weapons recovered using Pulse 8X detector

Law Enforcement and Dive Rescue News

.....Public safety dive teams continue to add side scan sonar to their equipment lockers, identifying it as an essential piece of gear for the squad. One of the most recent is Webster Rescue in Mass. Team leader Chris Jolda came to Fishers for a free sonar training course.

.....Olmstead Sheriffs dive team in Minnesota is using the Pulse 8X in their u/w search ops.

.....Missaukee County EMA in Michigan has purchased two of Fishers Pulse 6X detectors for their mutual aid dive team. Planning director Linda Harshorne-Shafer reports the detectors were "a big hit with the guys".



Divers from Missaukee and Wexford County with their Fisher U/W Metal Detectors

.....Snohomish County Sheriffs Office in Washington is using the SeaLion-2 in the search and recovery operations. Deputy TJ Malkow reports on one mission the ROV located a submerged car and two victims.

.....The Diver Division of the Policia de Puerto Rico are using a Pulse 8X detector to locate evidence and weapons.

.....Franklin County Sheriffs Office in Florida has purchased Fishers SeaOtter-2 ROV and SSS-600K side scan sonar for the search and recovery operations.

.....Anderson County Volunteer Rescue Squad in Tennessee has acquired Fishers TOV-1 towed video system. "This underwater camera system saves us hundreds of hours of dive time", says Chief Terry Allen.



Fairhaven, MA harbor master (l) and shellfish warden share the Fisher SeaLion ROV bought with a homeland security grant.

.....New England towns of Fairhaven and New Bedford share a common harbor. It is home to America's largest fishing port and also has a vibrant shipping industry. The towns purchased an ROV to give them the ability to inspect vessel's hulls and underwater structures without deploying a diver. The department choose JW Fishers SeaLion ROV as they were already using Fishers side scan sonar and metal detectors and are pleased with the performance. It was decided Fairhaven Harbormaster would be responsible for the ROV and access to the equipment was granted to the town's shellfish department to monitor the health of area shellfish beds, another important local industry.

.....DeKalb County Police dive team in Georgia is using a Pulse 8X detector.

.....Sturgeon Bay Police Dept. in Wisconsin is using the Pulse 8X metal detector in underwater search operations.

.....Wheeling, West Virginia police dept has acquired a side scan sonar for their underwater search and recovery operations. Lt. Phil Redford, Lt. Shawn Flanegin, Cpl. Rick Robbins and Ptl. Dan Holmes came to Fishers factory to receive a free day of factory training.



Members of the Wheeling, WV Police Dept. with their new Fisher side scan sonar

Company News and New Products

New - Acoustic Interrogator and Transponders



Diver with Interrogator, Inset - transponders

Attempting to relocate underwater objects in a low visibility environment can be a difficult and time consuming task. Acoustic transponders solve this problem. One advantage of using a transponder over a conventional acoustic pinger is that the transponder is "invisible" in the underwater environment until it is triggered to begin transmitting a signal. Another advantage is it's low power consumption.

A pinger constantly transmits an acoustic signal which uses up the battery, but a transponder sits in a dormant state using very little power until it is activated by the interrogator.

JW Fishers has introduced a line of low cost transponders and the interrogator used to locate them. The MFT-1 multifrequency

transponder is capable of transmitting 9 different frequencies between 24 kHz and 33 kHz. Having transponders with different frequencies allows many to be deployed in the same area with each transmitting a unique signal. The standard MFT-1 will operate from 4 to 8 months, depending on batteries installed. An optional extended housing is available that accepts more batteries, tripling the operating time. The optional Very Long Duration housing holds enough batteries to operate for several years.

Fishers DHI-1 interrogator is compatible with other manufacturer's transponders as well as its own, and will detect frequencies between 24 and 33 kHz. The transponder starts sending a signal when the interrogator hits it with a 26 kHz coded pulse. The two devices can communicate with each other at a distance up to 3,000 feet. The transponder broadcasts its signal which is picked up by the interrogator, guiding the operator directly to it. The DHI-1 can be carried by a diver or deployed from a boat. An earphone alerts the diver or topside operator to the detec-

tion of a signal, and a digital display shows distance, and built-in compass gives the heading. A

rechargeable NiCad battery pack powers the interrogator for 12 hours.

For more info on the transponder and interrogator go to www.jwfishers.com.

- **Get a \$100 gift certificate by sending us a good story or photo.**
- **Read articles about people using JWf equipment and see customer photos at www.jwfishers.com; click "Industry News" and "Photo Album" tabs at top of the page.**

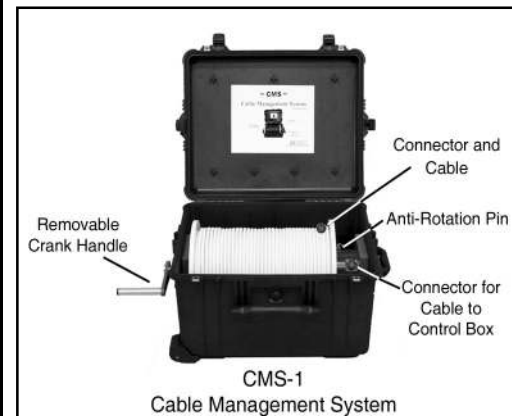
Cable Management System

JW Fishers is now offering a cable storage system as an option for their ROVs and side scan sonars. The system consists of a heavy duty, corrosion-proof reel with slip rings mounted in a rugged Pelican case. Slip rings allow complete operation of the equipment while deploying or retrieving cable.

Two different size reels are available. The smaller CMS-1 holds up to 500 feet of side scan cable or 250 feet of ROV umbilical. The larger CMS-2 holds up to 1,000 feet of side scan cable or 500 feet of ROV umbilical. Both cases have wheels and a retractable handle. A stainless steel removable handle attached to the drum makes it easy to manually spool the cable in or out.

Though specifically designed for Fishers ROVs and sonars, the cable management system can also be used with Fishers boat-towed detectors and video systems.

The complete CMS system is constructed of high-impact corrosion proof plastic and stainless steel for years of trouble-free performance. **JWF**



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